

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
SEMICONDUCTOR ENERGY LABORATORY  
CO., LTD.

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## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing (day/month/year)	06.12.2005
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Applicant's or agent's file reference  
00000PCT8133

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/JP2005/015963

International filing date (day/month/year)  
25.08.2005

Priority date (day/month/year)  
31.08.2004

International Patent Classification (IPC) or both national classification and IPC  
Int.Cl. **H01L29/786** (2006.01), **H01L51/05** (2006.01)

Applicant  
SEMICONDUCTOR ENERGY LABORATORY CO., LTD.

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Date of completion of this opinion	25.11.2005
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Name and mailing address of the ISA/JP

**Japan Patent Office**

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

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W  TEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

Int'l application No.

PCT/JP2005/015963

Box No. I

Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - ☒ the international application in the language in which it was filed
  - ☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material
    - ☐ on paper
    - ☐ in electronic form
  - c. time of filing/furnishing
    - ☐ contained in the international application as filed
    - ☐ filed together with the international application in electronic form
    - ☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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International application No.

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
- ☐ paid additional fees
  - ☐ paid additional fees under protest and, where applicable, the protest fee
  - ☐ paid additional fees under protest but the applicable protest fee was not paid
  - ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

☐ complied with

☒ not complied with for the following reasons:

The inventions of claims 1,4-5,11 and the inventions of claims 2-3,6-10 are linked to be one another only in respect of the feature "etching the semiconductor film using the mask to form a semiconductor layer". However, this feature is disclosed in a prior art document JP 2000-066233 A (HITACHI, LTD.), 2000.03.03. So the feature cannot be a special technical feature.

And there exists no special technical feature linking the inventions of claims 1,4-5,11 and the inventions of claims 2-3,6-10 as to form a single general inventive concept among the inventions.

Therefore there are no technical relationship which is considered as "special technical feature" (PCT rule 13.2) among the claims 1,4-5,11 and the claims 2-3,6-10. So this application contains the following groups of invention which are not so linked as to form a single inventive concept under PCT rule 13.2.

Group I: Claims 1,4-5,11  
Group II: Claims 2-3,6-10

4. Consequently, this opinion has been established in respect of the following parts of the international application:

☐ all parts

☒ the parts relating to claims Nos. 1, 4-5, 11

**WRITTEN OPINION OF THE  
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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims	1, 4-5, 11	YES
	Claims		NO
Inventive step (IS)	Claims	5	YES
	Claims	1, 4, 11	NO
Industrial applicability (IA)	Claims	1, 4-5, 11	YES
	Claims		NO

**2. Citations and explanations:**

D1:JP 07-221367 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.), 1995.08.18, Paragraphs [ 0026] -[ 0034] , Fig.3 (family: none)

D2:JP 01-108527 A (FUJITSU LIMITED), 1989.04.25, Page 3, lower left column, lines 13-19, Fig.1 (g) (Family: none)

Claims 1, 4, 11

The subject matter of claims 1, 4, 11 does not appear to involve an inventive step in view of the D1 and D2 cited in the ISR.

The technical feature etching the semiconductor film using the mask to form a semiconductor layer and forming a gate electrode over the mask with the mask remaining over the semiconductor layer is not disclosed in D1. However, said feature is virtually suggested in the D2. Therefore the person skilled in the art would easily conceive the idea of employing the feature to the method for manufacturing a semiconductor device disclosed in D1.

Claims 5

The subject matters of claim 5 are considered to involve an inventive step over the documents cited in the international search report.

None of the prior art documents cited in the international search report describes forming an inorganic film over the semiconductor film after forming the semiconductor film, and forming a barrier layer formed of the inorganic film by etching the inorganic film using the mask, and wherein the mask is formed over the inorganic film, and wherein the semiconductor layer is formed by etching the semiconductor film using the mask after forming the barrier layer.

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**Box No. VIII** Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 11 quotes Claim 1 and explains barrier, but 'barrier' is not described in Claim 1. So the subject matter of claim 11 is unclear.